

## **REMARKS/ARGUMENTS**

Claims 1, 3-6, 25-27, 29-32 and 41-45 are pending in this application. Applicant thanks the examiner for indicating that Claim 32 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The remaining claims stand rejected under 35 USC §103(a) as being unpatentable over US 5,556,618 to Ando in view of US 6,224,655 to Messier, or in further view of US 5,639,452 to Messier (claims 4 and 30).

### **Claim Rejections under 35 USC §103(a)**

#### **1. Claims 1, 3, 5, 6, 25-27, 29, 31 and 41-45**

Claims 1, 3, 5, 6, 25-27, 29, 31 and 41-45 stand rejected under 35 USC §103(a) as being unpatentable over US 5,556,618 to Ando (the '618 patent) in view of US 6,224,655 to Messier (the Messier patent).

#### **Brief Discussion of Relevant Prosecution History**

A similar rejection under §103(a) was presented in earlier Office actions in which the Messier patent was combined with US 5,873,968 to Pike to reject the claims for obviousness. In response, on September 25, 2009, Applicant submitted arguments traversing the rejection and arguing that the prior art actually teaches *away* from the claimed combination. The response was accompanied by a Declaration under 37 C.F.R. §1.132 to submit evidence of the unexpected successful results in combining iodinated resin with an electret as recited in the claims.

Subsequently, a December 9, 2009 Office action issued which upheld the rejections under §103, but conceded that “if the claims are amended to be commensurate in scope with the evidence, the rejection over Messier in view of Pike will be withdrawn and the claims in allowance for issue” (p. 7, 12/9/09 Office action). In addition, the examiner deemed the claims patentable over other cited art that disclosed a different antimicrobial with an electret, because “Applicant’s Declaration is stating and showing evidence that the results of substituting the iodinated resin for another antimicrobial are unexpected” (pp. 7-8, 12/9/09 Office action).

Applicant subsequently amended the claims to their current form to recite that the “porous dielectric carrier is a non-woven material” (Amendment dated 4/9/2010) and to clarify

*inter alia* that the article claimed is “for filtering and killing microorganisms in air” and the active agent is a “biocidal” (Supplemental Amendment dated 6/8/2010).

In view of these amendments to align the claims with the scope of the evidence presented, the examiner has now withdrawn the rejections over Messier in view of Pike.

*The Claims are patentable over US 5,556,618 to Ando ('618 patent) in view of US 6,224,655 to Messier.*

In the current Office action, the examiner has now combined the ‘618 patent with the Messier patent to reject the claims for obviousness. The examiner notes that the object of the invention of the ‘618 (Ando) patent is “to provide an antibacterial material having a good charge stability and an electret property while maintaining an antibacterial activity” (col. 1, ll. 60-63). The examiner states that “Ando teaches the nonwoven web is capable of holding an electrostatic charge in the presence of a biocidal active agent” and “differs from the current application and does not teach the active agent is iodinated resin” (p. 4, Office action). The examiner concludes “[i]t would have been obvious to one of ordinary skill in the art to *substitute an antibacterial agent of Ando with an iodinated resin* to produce a filter that attracts bacteria and microorganisms and then kills bacteria” (p. 5, Office action).

Applicant traverses this rationale. First, it has already been established that “Applicant’s Declaration is stating and showing evidence that the results of substituting the iodinated resin for another antimicrobial are unexpected” (*see* pp. 7-8, 12/9/09 Office action). None of the cited art, including the ‘618 Ando patent, provide any indication of the synergistic effect observed with the presently claimed combination. Second, the Ando patent adds nothing to the teaching of the prior art to dispute this showing. In particular, Ando does **not** teach or suggest that it would have been obvious to one of skill in the art to *substitute the agents disclosed* in the Ando patent with iodinated resin. As explained in Applicant’s Declaration and accompanying remarks submitted September 25, 2009, it was known that attempts had been made to combine antimicrobials with an electret in order to generate a filter with both good charge stability and antimicrobial effect (*see* ¶ 4, Declaration). However, it was also known that this was difficult due to the known deleterious effects of antimicrobials on the electrostatic properties of an electret. The Ando patent teaches nothing different and, in fact, was one of the references discussed in the Remarks that accompanied the Declaration submitted on September 25, 2009.

In particular, as discussed previously and further detailed below, the '618 patent reviews various attempts at generating an antimicrobial electret material and points out that the antimicrobial material generally deteriorates the electret performance of the filter and, hence, has a detrimental impact on filter performance. For example, the '618 patent describes the problem of the prior art in which filter material formed from fibers *treated with an organic antimicrobial* could not be charged by an adequate amount. In addition, the small charge that was imparted decayed rapidly (*see* '618 patent, col. 1, ll. 11-23).

In an attempt to mitigate these problems, the '618 patent teaches that a combination of electret stabilizers must be added, that a metal-ion-containing inorganic compound be used (*see, e.g.,* col. 2, ll. 22-26; col. 3, ll. 5-10), and that the amounts of each must be carefully controlled to try to stabilize the electret and retain the charge in the media. Yet *even in the presence of electret stabilizers*, the '618 patent teaches that if the content of the antimicrobial agent is too high, *"the electret property is deteriorated*, so that the upper limit of the content is preferably 4 % by weight" (col. 3, ll. 57-62). This limitation on the allowed concentration of antimicrobial severely diminishes the potential for producing an effective antimicrobial filter having superior antimicrobial efficacy and filtering properties.

In short, the '618 patent merely confirms what the prior art as a whole teaches: that is, the addition of antimicrobials generally deteriorates the stability of electrets, making it difficult to develop an effective antimicrobial nonwoven electret. Certainly, there is no teaching in the '618 patent or in the prior art as a whole that any antimicrobial, in particular, iodinated resin, could be substituted for those metal-ion-containing inorganic compounds and combined with the electret of the '618 patent with good results. In fact, the prior art specifically teaches against iodine as an additive to an electret and nothing in the '618 patent or the Messier patent suggests otherwise. In fact, as discussed in the 9/25/09 Remarks accompanying the Declaration, U.S. Patent No. 4,086,499 ("the '499 patent") not only teaches that additives generally result in significant charge decay of a nonwoven electret, but that polarizable groups *such as iodine* are particularly deleterious (*see* the '499 patent, col. 1, ll. 67). Therefore, there was a lack of motivation to make the currently claimed invention as of the filing date of the present application. In particular, given the prior art failures and difficulties encountered in the development of antimicrobial nonwoven electret filters, especially the particular problems with iodine, there would not be a

reasonable expectation that one would succeed as the Applicant in the presently claimed invention clearly has.

Therefore, the prior art as a whole teaches away from the combination of a porous dielectric carrier and *an iodinated resin* as recited in the present claims and, thus, it would not be obvious “to substitute an antibacterial agent of Ando with an iodinated resin” (Office Action, p. 5) of the Messier patent. Certainly, none of the prior art including the ‘618 patent recognizes, teaches or suggests using an antimicrobial agent as a charge stabilizer in a nonwoven material, as the Applicant surprisingly found, or that the claimed combination has a synergistic effect, not only stabilizing but *enhancing* the electrostatic charge and, thus, enhancing both the filtering and antimicrobial efficacy. Objective evidence presented of non-obviousness must be considered in any rejection under 35 U.S.C. §103, and as the Examiner previously noted, “Applicant’s Declaration is stating and showing evidence that the results of substituting the iodinated resin for another antimicrobial are unexpected” (pp. 7-8, 12/9/09 Office action).

At least for the reasons presented above, independent claims 1 and 25, each of which recites the combination of an iodinated resin and a porous dielectric carrier, are non-obvious and patentable over the cited prior art. At least by virtue of their dependency from claims 1 and 25, respectively, claims 3, 5, 6, 41, 44 and 26, 27, 29, 31, 32, 42, 43, 45 are likewise patentable over the cited prior art. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejections under 35. U.S.C. §103(a).

## 2. Claims 4 and 30

Claims 4 and 30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over US 5,556,618 to Ando (the ‘618 patent) in view of U.S. 6,224,655 (the Messier patent) and in further view of U.S. 5,639,452 to Messier (the Messier ‘452 patent). The Examiner repeats the rejection with respect to claim 1 and further adds that Messier ‘452 teaches an iodinated resin where the iodine is impregnated in the resin, particles of an iodinated anion exchange resin, and a spongy foam having dispersed within the polymeric matrix particulates.

Applicant submits that Messier ‘452 does not correct the deficiencies present in the Messier and the ‘618 patent, which are presented above. Accordingly, for at least the same reasons discussed with respect to claims 1, 3, 5, 6, 25-27, 29, 31 and 41-45, claims 4 and 30 are

patentable over the prior art. Applicant respectfully requests reconsideration and withdrawal of the rejections under 35. U.S.C. 103(a).

### **CONCLUSION**

In light of the foregoing, Applicant respectfully submits that all rejections have been overcome and that the pending claims are now in condition for allowance.

It is believed that no fees are necessitated by the present Response. However, in the event that any fees are due, the Commissioner is hereby authorized to charge any such fees to Deposit Account No. 06-0923. The Commissioner is likewise authorized to credit any overpayment to Deposit Account No. 06-0923.

If the Examiner believes that a telephone conversation with Applicant's attorney would expedite allowance of this application, the Examiner is cordially invited to telephone the undersigned attorney at the number provided below.

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Respectfully submitted,

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